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EXAMINER

NGUYEN, LINH THI

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/693,935

Applicant(s)

MIMORI ET AL.

Examiner

Linh T. Nguyen

Art Unit

2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-114 is/are pending in the application.
- 4a) Of the above claim(s) 1-38 and 60-114 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 39-59 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Claims 1-38 and 60-114 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 9/12/06.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 42 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 42, line 6, stated "peripheral region is converged out of an information," is not supported in the specification (or US Publication 20040085662). The closest interpretation supported by the specification is in paragraph [0144] and [0145], stated, "the peripheral area can be converged on a portion outside the information recording surface." Hence, there would be undue experimentation to make and use the invention as claimed.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 58 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 58, R2 and R1 are indefinite as not being defined.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 39, 44, 45, 47-52, 57 and 59, are rejected under 35 U.S.C. 102(e) as being anticipated by Shimozono (US Publication 20030117931).

In regards to claims 39 and 59, Shimozono discloses an optical pickup apparatus; comprising: a first light source to emit a light flux having a first wavelength  $\lambda_1$  (Paragraph [0052], 655 nm); a second light source to emit a light flux having a second wavelength  $\lambda_2$  ( $\lambda_1 < \lambda_2$ ) (Paragraph [0052], 785nm); a plurality of optical elements including an objective optical element (Fig. 5), wherein the optical pickup apparatus conducts reproducing and/or recording information by converging a light flux having the first wavelength  $\lambda_1$  onto a first optical information recording medium provided with a

protective substrate having a thickness  $t_1$  and by converging a light flux having the second wavelength  $\lambda_2$  onto a second optical information recording medium provided with a protective substrate having a thickness  $t_2$  ( $t_1 < t_2$ ) (Paragraph [0056]); wherein at least one optical element of the plurality of optical elements has at least two regions of a central region having a center on the optical axis and a peripheral region located at a periphery of the central region on at least one optical surface (Fig. 1); wherein on the central region, step-shaped discontinuous sections (Fig. 1, element 21a, 26a) having the predetermined number of steps (Fig. 1, each has 4 steps) are formed periodically concentrically around the optical axis (Fig. 1, element 4) so that the central region is equipped with a phase modulating structure to provide a phase difference to at least one of a light flux of the wavelength  $\lambda_1$  and a light flux of the wavelength  $\lambda_2$  and to converge the light flux provided with the phase difference onto a predetermined optical information recording medium (Paragraph [0030]) on a condition that a spherical aberration and/or a wavefront aberration is corrected in cooperation with the objective optical element (Paragraph [0033]), and wherein the both of a light flux having the first wavelength  $\lambda_1$  and a light flux having the second wavelength  $\lambda_2$  come as a divergent light flux into the objective optical element (Fig. 5).

In regards to claims 44 and 45, Shimozono discloses the optical pickup apparatus of claim 39, wherein the peripheral region comprises a phase modulating structure similar to the phase modulating structure formed on the central region (Fig. 8

and 9).

In regards to claim 47, Shimozone discloses the optical pickup apparatus of claim 39, wherein the peripheral region comprises step-shaped discontinuous sections on a prescribed a spherical surface and the step-shaped discontinuous sections are shifted respectively in parallel to the optical axis (Fig. 9).

In regards to claim 48, Shimozone discloses the optical pickup apparatus of claim 39, wherein the step-shaped discontinuous sections provided on the phase modulating structure of the central region has plural step-shaped discontinuous sections and the number of steps of at least one of the plural step-shaped discontinuous sections is 4 (Fig. 1).

In regards to claim 49, Shimozone discloses the optical pickup apparatus of claim 39, wherein the step-shaped discontinuous sections provided on the phase modulating structure of the central region has plural step-shaped continuous sections and the number of steps of at least one of the plural step-shaped discontinuous sections is 5 (Fig. 1 and Paragraph [0032]).

In regards to claim 50, Shimozone discloses the optical pickup apparatus of claim 39, wherein the following formulas are satisfied:

$$620 \leq \lambda_1 \leq 680 \text{ nm}$$

$750 \leq \lambda \leq 810 \text{nm}$  (Paragraph [0052]).

In regards to claims 51 and 57, Shimosono discloses the optical pickup apparatus of claim 39, wherein the phase modulating structure is formed on an optical element other than the objective optical element (Paragraph [0034]).

In regards to claim 52, Shimosono discloses the optical pickup apparatus of claim 39, wherein the phase modulating structure is formed on the objective optical element (Paragraph [0030]).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 40-43, 46, 53, 54 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimosono in view of Arai et al (US Publication number 20050254397).

In regards to claim 40, Shimosono discloses everything as claimed in claim 39. However, Shimosono does not disclose an optical pickup device wherein the period of the step-shaped discontinuous sections is represented by an integer portion of

$(\Phi(h)/2\pi)$ , where  $\Phi(h)$  is a phase function defined by the formula:

$\Phi(h) = (B_{\text{sub}.2}h^{\text{sup}.2} + B_{\text{sub}.4}h^{\text{sup}.4} + B_{\text{sub}.6}h^{\text{sup}.6} + \dots B_{\text{sub}.n}h^{\text{sup}.n} \cdot 2\pi)$  by

using a height  $h$  from the optical axis and the coefficient  $B_{\text{sub}.n}$  of  $n$ -th order optical path difference function ( $n$  is an even number), and the following formula is satisfied:

$0 \leq |\Phi(h_{\text{sub}.in})/2\pi - B_{\text{sub}.2}(h_{\text{sub}.in})^2| \leq 10$  where  $B_{\text{sub}.2}$  is a coefficient of second order optical path difference and  $h_{\text{sub}.in}$  is a height from the optical axis to a position located farthest from the optical axis in the central region.

In the same field of endeavor, Arai et al discloses an optical pickup device wherein the period of the step-shaped discontinuous sections is represented by an integer portion of  $(\Phi(h)/2\pi)$ , where  $\Phi(h)$  is a phase function defined by the formula:  $\Phi(h) = (B_{\text{sub}.2}h^{\text{sup}.2} + B_{\text{sub}.4}h^{\text{sup}.4} + B_{\text{sub}.6}h^{\text{sup}.6} + \dots B_{\text{sub}.n}h^{\text{sup}.n} \cdot 2\pi)$  by using a height  $h$  from the optical axis (Paragraph [0664]; equation 1) and the coefficient  $B_{\text{sub}.n}$  of  $n$ -th order optical path difference function ( $n$  is an even number), and the following formula is satisfied:  $0 \leq |\Phi(h_{\text{sub}.in})/2\pi - B_{\text{sub}.2}(h_{\text{sub}.in})^2| \leq 10$  where  $B_{\text{sub}.2}$  is a coefficient of second order optical path difference and  $h_{\text{sub}.in}$  is a height from the optical axis to a position located farthest from the optical axis in the central region (Paragraph [0610]). At the time of the invention it would have been obvious to person of ordinary skill in the art to combine the optical pickup apparatus of Shimozono to have a phase function formula as taught by Arai et al. The motivation for doing so would have been to correct the spherical aberration with 2 different wavelength light (Paragraph [0606], lines 19-20).



In regards to claim 41, Shimozono does not but Arai et al discloses the optical pickup apparatus, wherein the following formula is satisfied:

$$\frac{B \cdot \sin^2(h \cdot \sin \theta)}{2 \cdot \lambda} \leq 18$$
 (Paragraph [0610], the value 10mm is within the range). The motivation is the same as claim 40 above.

In regards to claim 42, Shimozono does not but Arai et al discloses the optical pickup, wherein among a light flux having the second wavelength  $\lambda_2$  a light flux having passed through the central region is converged on an information recording plane of the second information recording medium and a light flux having passed through the peripheral region is converged out of an information recording plane of the second information recording medium (Paragraph [0249]). At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the optical pickup apparatus of Shimozono to have a light flux having the second wavelength passing through the central region is converged and a light flux passing through peripheral region is converged outside of recording plane as taught by Arai et al. The motivation for doing so would have been to reduce the aberration between two light fluxes.

In regards to claim 43, Shimozono does not but Arai et al discloses optical pickup apparatus, wherein the peripheral region comprises a refractive structure to refract a light flux (Paragraph [0250]). The motivation is the same as claim 42 above.

In regards to claim 46, Shimozono does not but Arai et al discloses the optical pickup, wherein the peripheral region comprises saw teeth-shaped diffractive ring-shaped zones (Paragraph [0210]). The motivation is the same as claim 42 above.

In regards to claim 53, Shimozono does not but Arai et al discloses the optical pickup, wherein an optical system magnification  $m$  satisfies the following formula:  $-0.149 \leq m \leq -0.049$  (Fig. 110). At the time of the it would have been obvious to a person of ordinary skill in the art to modify the optical pickup of Shimozono to have an optical system magnification within the range of  $-0.149$  to  $-0.049$  as Arai et al suggested. The motivation for doing so would have been to lower the wavefront aberration.

In regards to claim 54, Shimozono does not but Arai et al discloses the optical pickup apparatus, wherein the phase modulating structure on the central region does not provide a phase difference for a light flux having the first wavelength  $\lambda_1$  or regulate the absolute value of a phase difference provided by the depth of each step of the step-shaped discontinuous sections smaller than  $2\pi$  radian (Paragraph [0247] and [0249]). The motivation is the same as claim 40 above.

In regards to claim 56, Shimozono does not but Arai et al discloses the optical pickup, wherein the number of the step-shaped discontinuous sections provided to the

Art Unit: 2627

phase modulating structure of the central region is 3 to 18 (Paragraph [216]). The motivation is the same as claim 42 above.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Linh T. Nguyen whose telephone number is 571-272-5513. The examiner can normally be reached on 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
WAYNE YOUNG  
SUPERVISORY PATENT EXAMINER

LN  
November 21, 2006